Appl. No. 10/626,929
Response Dated September 8, 2005
Reply to Office Action mailed July 8, 2005

Remarks/Arguments

Applicant has received and carefully reviewed the Office Action of the Examiner mailed July 8, 2005. Claims 15 and 16 have been canceled. Claims 1-14, 17-25 and 32-35 remain pending. Applicants respectfully submit that no new issues have been raised by this amendment. Entry of the amendment, reconsideration and reexamination are respectfully requested.

Interview

Applicants thank the Examiner for agreeing to discuss the features of independent claim 1 and the teachings of Gauthier, especially with respect to Figures 6A-6D of Gauthier. No agreement was reached.

Rejection under 35 U.S.C. § 103

Claims 1-14, 17-25, and 32-35 remain rejected as being unpatentable over Gauthier (US 5,911,747). The Examiner states that Gauthier teaches a system in which when the call time resulting from high humidity is greater than a given amount, the minimum on time is increased based upon the amount of the call time (blocks 260, 264, 268 of Figure 6C). The Examiner then asserts that it would have been obvious to modify the system of Gauthier to increase the minimum on time by a fixed amount rather than the variable increase of Gauthier.

Applicants previously argued that Gauthier only adjusts the minimum run time when the humidity is below a predetermined level. In response, the Examiner asserts that in the control method shown in Figures 6A-6D, Gauthier teaches the "call timer", started in block 224, will increase as long as the humidity is above a given level since the control will not reach blocks 242, 244, 256, 258 until the humidity is reduced below the given level, so that when the control reaches blocks 260-270, the "call timer" will have reached a time greater than the test in blocks 260, 264, or 268 based on how long it took to reduce the humidity.

Applicants do not understand this argument. The Examiner has stated that Gauthier teaches exactly what Applicants argued, i.e., increasing the minimum run timer only when the

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humidity is <u>reduced</u> below the given level. The Examiner states that Gauthier teaches the <u>call</u> <u>timer</u> as having reached a greater time in blocks 260, 264, or 268 based on how long it took to <u>reduce</u> the humidity.

First, and from the Examiner's remarks, it appears that the Examiner is construing the "call time" of Gauthier as corresponding to the minimum "on" time recited in the claims. This, however, is improper. As noted in the present specification:

> This is particularly problematic when the cooling capacity of the air conditioner is large relative to the cooling demands of the inside space. In some cases, the air conditioner is simply oversized for the size of the inside space, and in other cases, the environmental conditions only present a limited heat load to the air conditioner. In either case, the air conditioner typically may satisfy a call for cooling in a relatively short time period, which may result in relatively short duty cycles. To prevent very short duty cycles, which could damage the air conditioner, many manufacturers specify a minimum "on" time for their air conditioning units. However, because the minimum "on" time is specified for a different purpose (e.g. to prevent damage), the minimum "on" time requirement is typically too short (e.g. 3 minutes or less) to allow for any significant water removal during this period. For these and other reasons, it has been found that existing control algorithms that attempt to moderate or reduce humidity using an air conditioner, particularly when the air conditioner is under low or moderate load conditions, are not very effective.

(Specification, page 1, line 23 through page 2, line 11). The specification further states:

> In one illustrative embodiment of the present invention, the humidity level in the controlled space is monitored by one or more thermostats/humidistats 30 and 32. If the humidity level in the inside space 10 (or a zone within the inside space 10) exceeds a predetermined humidity threshold level, the minimum "on" time for the air conditioner may be extended. For example, as shown in Figure 2, an extended minimum on time t_M may be selected, causing the air conditioner 24 to run until time t_M rather than time t_C. In this illustrative embodiment, the minimum "on" time t_M may be a preselected minimum "on" time number, which is stored in a memory of the controller 20. This may result in a greater amount of latent cooling (i.e. moisture removal) in the inside space 10. Because the air conditioner 24 may be left on after the temperature needs of the inside space 10 have been met, the inside space 10 may be cooled to a temperature that is below the current temperature set point. In some cases, the space can be cooled one, two, or five or more degrees below the desired temperature set point. However, deterioration and health hazards related to extended high humidity conditions in

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the inside space 10 may be reduced or avoided.

(Specification, page 6, lines 8-22). Applicants respectfully submit that one of ordinary skill in the art, upon reading the instant specification and claims, would understand that the claimed minimum "on" time would, if anything, be analogous to the minimum run time of Gauthier, and not the "call time".

Independent claim 1 recites a method involving the steps of (1) determining if the humidity level is above a predetermined level, and (2) increasing the minimum "on" time of the air conditioner if the humidity is above the predetermined level. Applicants submit that the flowchart shown in Figures 6A-6D of Gauthier clearly illustrates that the minimum run time is only increased in blocks 262 and 266 (Fig. 6C). Fig. 6B clearly shows that the only way to arrive at block 262 (increase minimum run time) is by answering "yes" to the question "is humidity < max. limit?" in block 240. Thus, Gauthier clearly teaches only increasing the minimum run time when the humidity is below the maximum limit. In fact, Gauthier specifically teaches that "[c]ooling will thus continue at maximum output during high humidity periods." See column 13, lines 19-21. That is, the system of Gauthier will not enter the energy recovery mode until the humidity is less than the maximum limit, and no changes will be made to the minimum run time of Gauthier's system.

Gauthier teaches an energy-saving system that enters an energy "recovery mode", where under certain circumstances, the compressor of the air conditioner is turned off and on one or more times during a single pending cooling call, but only after the humidity and temperature of the controlled space are already forced to be below predetermined maximum limits. As noted above, Gauthier specifically teaches that "[c]ooling will thus continue at maximum output during high humidity periods." See column 13, lines 19-21.

More specifically, and referring to Figure 6A, the system of Gauthier will stay in the loop between block 232 and block 240 (with the minimum run timer set to 4 minutes) until the humidity is below the maximum limit. Once the humidity drops, and if: (1) the 2nd stage cooling is not required (block 242); (2) the cooling call is not satisfied (block 244); and (3) the minimum

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run timer is satisfied (block 356), only then will the system reach block 262 and 266, where the energy "recovery mode" may be entered so long as the ambient air temperature in the inside space (Tr) is less than 80° F (Block 270). If the ambient air temperature in the inside space (Tr) is not less than 80° F (Block 270), control is passed back to block 232 of Figure 6A.

In the energy recovery mode of Gauthier, the air conditioning compressor is turned off and energy is recovered from the system components, such as the air ducts, etc. This occurs during the pending cooling call. Once sufficient energy can no longer be recovered from the system components, the air conditioning compressor may again be turned on, this time using the longer minimum run times as set in blocks 262 and 266. The parameters used to determine when to re-activate the air conditioning compressor in the energy recovery mode are set forth in blocks 276-284 of Figure 6D. As shown at block 286 of Figure 6D, if the pending cooling call is not yet satisfied, the air conditioning compressor may be re-activated at step 230 of Figure 6A, assuming the short cycle timer is satisfied. Note, however, as soon as the current cooling call is satisfied, operation of the compressor and fan are stopped, and control is passed to step 220 to wait for another cooling call from a thermostat. Once a new cooling call is received, the minimum run timer is again set to 4 minutes, at shown at step 226.

As can readily be seen, Gauthier clearly does not suggest increasing the minimum "on" time of an air conditioner if the humidity is above a predetermined level, as recited in claim 1. In fact, Gauthier would appear to actually teach away from claim 1, since Gauthier clearly teaches only increasing the minimum run time when the humidity is below the maximum limit. For these and other reasons, claim 1 is believed to be clearly patentable over Gauthier. For similar and other reasons, claim 17 is also believed to be clearly patentable over Gauthier. If this rejection is maintained, Applicants respectfully request the Examiner point out specifically where in the Gauthier reference it is taught or suggested to increase the minimum "on" time (not the call time) if the humidity is above a predetermined level.

Additionally, there would appear to be no motivation for one of ordinary skill in the art to modify the system and method of Gauthier to do the opposite of what Gauthier teaches, and adjust the minimum "on" time when the humidity is higher than the maximum limit because

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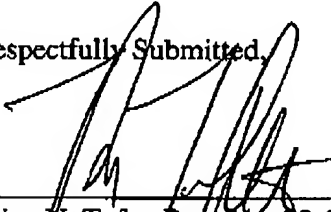Reply to Office Action mailed July 8, 2005

Gauthier specifically teaches that "[c]ooling will thus continue at maximum output during high humidity periods." see column 13, lines 19-21. As Gauthier does not appear to teach the basic elements of independent claim 1, claim 1 is believed to be clearly patentable over Gauthier. For similar and other reasons, claims 2-14, 17-25, and 32-35 are also believed to be clearly patentable over Gauthier. Withdrawal of the rejection is respectfully requested.

Claims 15 and 16 remain rejected as being unpatentable over Fukumoto et al. (US 4,540,040). Although Applicants respectfully disagree that claims 15-16 are unpatentable over Fukumoto et al., because we are now after final, claims 15 and 16 have been canceled without prejudice. As such, the rejections of these claims are rendered moot.

Reconsideration and reexamination are respectfully requested. It is submitted that, in light of the above remarks, all pending claims 1-14, 17-25 and 32-35 are now in condition for allowance. If a telephone interview would be of assistance, please contact the undersigned attorney at 612-359-9348.

Respectfully Submitted,

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Brian N. Tufte, Reg. No. 38,638
CROMPTON, SEAGER & TUFTE, LLC
1221 Nicollet Avenue, Suite 800
Minneapolis, Minnesota 55403-2420
Telephone: 612-677-9050
Facsimile: (612) 359-9349

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